General Characteristics		
1	**Abstract of Model Capabilities**	GENII is a general purpose environmental health physics code. It can be used to evaluate radiation doses to individuals or populations from acute or chronic atmospheric or aquatie releases, or from a set-initial conditions such as spills, contaminated soil, or disposal sites. GENII handles chain decay and ingrowth of up to 100 radio nuclides simultaneously. Modules are also provided to calculate dose factor from acute or chronic inhalation, ingestion, or external exposure using ICRP-26/30/48 methods.
2	**Sponsor and/or Developing Organization**	Bruce Napier Pacific Northwest National Laboratory P.O. Box 999 Richland, WA 99352 (509) 375-3896 (509) 375-2019 **Fax** Bruce.Napier@PNL.gov **sponsoring organization** **developing organization**
3	**Last Custodian/ Point of Contact**	Bruce Napier Pacific Northwest National Laboratory P.O. Box 999 Richland, WA 99352 (509) 375-3896 (509) 375-3896 **Fax** Bruce.Napier@PNL.gov **primary individual** **secondary individual**
4	**Life-Cycle**	After 3 years of development, the initial release version was 1.351. Current release is 1.485. This version has been stable since December 1990. A stochastic version, GENII-S, has been developed in consultation with Sandia National Laboratory. Both versions are avaiable from RSICC. A new release is under development which will be updating all user interfaces, and the dosimetry, risk, and atmospheric transport submodels. It will be released some time in 1998.
5	**Model Description Summary**	GENII is a general purpose model for environmental radiation dosimetry. Components include acute/chronic atmospheric transport, acute/chronic surface water transport, environmental behavior, individual dosimetry, and soil models (including biotic transport).
6	**Application Limitation**	GENII is designed for application in relatively stable exposure regimes where annual average parameters apply. GENII does not address groundwater transport, radon emanation, or short-term meteorology.
7	**Strengths/ Limitations**	**Strengths:** Ease use of regulatory approval completeness **Limitations:** No “risk” calculation-planned for 1998. Not appropriate for “near-field” atmospheric transport-e.g., worker doses in accidents.
8	**Model References**	B.A. Napier, R.A. Peloquin, D.L. Strenge, and J.V. Ramsdell. 1988. “GENII-The Hanford Environmental Radiation Software System”, PNL-6584 Volume 1: Conceptual Representation, Volume 2: Users’ Manual, Volume 3: Code Maintenance Manual. Pacific Northwest Laboratory, Richland, WA.
9	**Input Data/Parameter Requirements**	Annual average joint frequency of wind speed, wind direction and stability class. Population distributions. Food intake parameters. Food distribution networks (if available).
10	**Output Summary**	Committed, cumulative, and maximum annual radiation dose by organ and by pathway to individuals and/or population groups..
11	**Applications**	Environmental Impact Statements, Safety Analysis Reports, annual reports for site regulatory compliance, radiological performance assessments.
12	**User-Friendliness**	User interface module APPRENTICE incorporates significant logic to streamline input preparation and prepares batch files for later use. Help screens are available for nearly all input parameters. Error messages are also provided in each module of the code in case users get past the input logic-(e.g., for instance by direct input file manipulation.)
13	**Hardware-Software Interface Constraints/ Requirements**	**Computer operating system:** DOS 3.1 or higher **Computer platform:** IBM AT, PS/2 80 386 or higher **Disk space requirements:** minimal installation 2 megabytes, typical 5 megabytes. **Run execution time** (for a typical problem)**:** 5 seconds **Programming language:** BASIC/FORTAN **Other computer peripheral information:**

14	**Operational Parameters**	**Identify whether the code has any error diagnostic messages to assist the user in troubleshooting operational problems:** yes **Set up time for: Typical times are: *first-time user:*** 20 minutes ***experienced user:*** 2 minutes
15	**Surety Considerations**	**All quality assurance documentation:** 2 bookcases **Benchmark runs:** yes **Validation calculations:** yes **Verification with field experiments that has been performed with respect to this code:** Participated in IAEA VAMP program
16	**Runtime Characteristics**	a few seconds to a few minutes on most PCs above a 80386. Requires up to 550 Kilobytes of memory, depending on applications

Specific Characteristics

Part A: Source Term Submodel Type (Not Applicable)

Part B: Dispersion Submodel Type

B1	**Gaussian**	**✔ Straight-line plume __ Segmented plume __ Statistical plume __ Statistical puff** Atmospheric diffusion parameters can be input directly by the user or calculated by RSAC-5. RSAC-5 calculates plume standard deviations (σs) developed for three different conditions. Hilsmeier-Gifford σs were developed for desert terrains and releases from a few to 15 minutes. Markee σs were also been developed for a desert terrain; however, they were developed for releases from 15 to 60 minutes in duration. Pasquill-Gifford σs are presented in the NRC Regulatory Guide 1.145 and by Slade (1968) from the Prairie Grass experiments for effluent releases with durations of 10 to 60 minutes.
B2	**Similarity**	**✔ Plume ✔ Puff** Plume releases are modeled by the direct input of /Qs to the program by the user. Puff releases are modeled by requesting the program to calculate σs or the user can directly input σs.

Part C: Transport Submodel Type (No Information Provided.)

Part D: Fire Submodel Type (Not Applicable)

Part E: Energetic Events Submodel Type (Not Applicable)

Part F: Health Consequence Submodel Type (No Information Provided.)

Part G: Effects and Countermeasures Submodel Type (No Information Provided.)

Part H: Physical Features of Model (No Information Provided.)

Part I: Model Input Requirements (See Item 9.)

Part J: Model Output Capabilities (See Item 10.)

Part K: Model Usage Considerations (See Items 5 -7.)